Amendments to the Claims

Please amend Claims 1, 3-5, 8, 12, 14-16, 19, 23, 24, 26, 27, 29, 31, 32, 34 and 35, and add new Claims 36-41 to read as follows. Note that all the claims currently pending in this application, including those not presently being amended, have been reproduced below.

1. (Currently amended) A printing apparatus for performing printing by using a printhead having a plurality of printing elements, comprising:

~~counting means for counting the number of simultaneously driven printing elements of said plurality of printing elements when printing data is printed;~~

determining means for determining a fundamental pulse ~~width~~ shape on the basis of a driving condition according to a condition of the printhead in a period other than a printing period; ~~and~~

counting means for counting the number of simultaneously driven printing elements of the plurality of printing elements in the printing period; and

control means for controlling a driving pulse to be applied to printing elements used in the printing of the printing data, wherein the driving pulse is a pulse generated in the printing period by correcting the fundamental pulse ~~width~~ shape determined by said determining means on the basis of the number of simultaneously driven printing elements counted by said counting means.

2. (Previously amended) The apparatus according to claim 1, wherein the driving condition includes at least one of a wiring resistance, heater resistance, driving TrON resistance, and environmental temperature of said printhead.

3. (Currently amended) The apparatus according to claim 1, further comprising:

storage means for storing a first management table for managing the correspondence of the driving condition with the fundamental pulse ~~width~~ shape, and a second management table for managing the correspondence of the fundamental pulse ~~width~~ shape with a change amount of the fundamental pulse ~~width~~ shape based on the number of simultaneously driven printing elements; and

second determining means for determining a change amount of the fundamental pulse ~~width~~ shape, which corresponds to the number of simultaneously driven printing elements, by using the second management table,

wherein said ~~first~~ determining means determines the fundamental pulse ~~width~~ shape by using the first management table, and

said control means changes the fundamental pulse ~~width~~ shape determined by said ~~first~~ determining means by the change amount determined by said second determining means to generate a driving pulse to be applied to printing elements used in the printing of the printing data.

4. (Currently amended) The apparatus according to claim 1, wherein said control means defines the fundamental pulse ~~width~~ shape by either one of leading and trailing edges of a pulse signal on the basis of the driving condition, and controls a driving pulse width of a driving pulse to be applied to printing elements by the other of the leading and trailing edges of the pulse signal, on the basis of the number of simultaneously driven printing elements.

5. (Currently amended) The apparatus according to claim 4, further comprising storage means for storing a first management table for managing the correspondence of the driving condition with the fundamental pulse ~~width~~ shape, a second management table for managing the correspondence of the fundamental pulse ~~width~~ shape with a change amount of the fundamental pulse ~~width~~ shape based on the number of simultaneously driven printing elements, and a third management table for managing the correspondence of rise time and fall time of the pulse signal, the driving condition, and the fundamental pulse ~~width~~ shape, and

said control means controls a pulse width of the driving pulse corresponding to the number of simultaneously driven printing elements and the driving conditions by using the third management table.

6. (Previously amended) The apparatus according to claim 1, further comprising a plurality of printheads, and

if power lines for supplying power to said printheads are independent of each other, said control means executes the control for each power line.

7. (Original) The apparatus according to claim 1, wherein said control means makes a change amount for the driving pulse, which said control means generates by changing a pulse width of the fundamental pulse when the number of simultaneously driven printing elements is not less than a predetermined value, smaller than a change amount for the driving pulse, which said control means generates by changing a pulse width of the fundamental pulse when the number of simultaneously driven printing elements is less than the predetermined value.

8. (Currently amended) The apparatus according to claim 1, wherein said control means, when the number of simultaneously driven printing elements is not more than a predetermined value, sets a pulse width of the driving pulse larger than a pulse width calculated from the fundamental pulse ~~width~~ shape on the basis of the number of simultaneously driven printing elements.

9. (Previously amended) The apparatus according to claim 1, wherein if the number of simultaneously driven printing elements for use in predischarge for recovering said printhead is limited, said control means makes a pulse width of a driving pulse to be applied to printing elements used in the predischarge larger than a pulse width

of a driving pulse to be applied to printing elements for use in printing which uses printing elements not less than the number of simultaneously driven printing elements.

10. (Previously amended) The apparatus according to claim 1, wherein when predischarge for recovering said printhead is to be performed, said control means applies a driving pulse having a predetermined width to printing elements used in the predischarge.

11. (Previously amended) The apparatus according to claim 1, wherein each printing element comprises an ink discharge unit comprising an electrothermal transducer for discharging ink by generating a bubble in the ink by heat and a discharge orifice.

12. (Currently amended) A method of controlling a printing apparatus for performing printing by using a printhead having a plurality of printing elements, comprising:

~~a counting step of counting the number of simultaneously driven printing elements of said plurality of printing elements when printing data is printed;~~

a determination step of determining a fundamental pulse ~~width~~ shape on the basis of a driving condition according to a condition of the printhead in a period other than a printing period; ~~and~~

a counting step of counting the number of simultaneously driven printing elements of the plurality of printing elements in the printing period; and

a control step of controlling a driving pulse to be applied to printing elements used in the printing of the printing data, wherein the driving pulse is a pulse generated in the printing period by correcting the fundamental pulse ~~width~~ shape determined in said determination step on the basis of the number of simultaneously driven printing elements counted in said counting step.

13. (Previously amended) The method according to claim 12, wherein the driving condition includes at least one of a wiring resistance, heater resistance, driving TrON resistance, and environmental temperature of said printhead.

14. (Currently amended) The method according to claim 12, further comprising:

a storage step of storing a first management table for managing the correspondence of the driving condition with the fundamental pulse ~~width~~ shape, and a second management table for managing the correspondence of the fundamental pulse ~~width~~ shape with a change amount of the fundamental pulse ~~width~~ shape based on the number of simultaneously driven printing elements; and

a second determination step of determining a change amount of the fundamental pulse shape, which corresponds to the number of simultaneously driven printing elements, by using the second management table,

wherein the ~~first~~ determination step determines the fundamental pulse ~~width~~ shape using the first management table, and

the control step comprises changing the fundamental pulse ~~width~~ shape determined in the ~~first~~ determination step by the change amount determined in the second determination step to generate a driving pulse to be applied to printing elements used in the printing of the printing data.

15. (Currently amended) The method according to claim 12, wherein the control step comprises defining the fundamental pulse ~~width~~ shape by either one of leading and trailing edges of a pulse signal on the basis of the driving condition, and controlling a driving pulse width of a driving pulse to be applied to printing elements by the other of the leading and trailing edges ~~at~~ of the pulse signal, on the basis of the number of simultaneously driven printing elements.

16. (Currently amended) The method according to claim 15, further comprising a storage step of storing a first management table for managing the correspondence of the driving condition with the fundamental pulse ~~width~~ shape, a second management table for managing the correspondence of the fundamental pulse ~~width~~ shape with a change amount of the fundamental pulse ~~width~~ shape based on the number of simultaneously driven printing elements, and a third management table for managing the correspondence of rise time and fall time of the pulse signal, the driving condition, and the fundamental pulse ~~width~~ shape, and

said control step comprises controlling a pulse width of the driving pulse corresponding to the number of simultaneously driven printing elements and the driving conditions by using the third management table.

17. (Original) The method according to claim 12, wherein said printing apparatus comprises a plurality of printheads, and

if power lines for supplying power to said printheads are independent of each other, the control step comprises executing the control for each power line.

18. (Original) The method according to claim 12, wherein the control step comprises making a change amount for the driving pulse, which the control step generates by changing a pulse width of the fundamental pulse when the number of simultaneously driven printing elements is not less than a predetermined value, smaller than a change amount for the driving pulse, which the control step generates by changing a pulse width of the fundamental pulse when the number of simultaneously driven printing elements is less than the predetermined value.

19. (Currently amended) The method according to claim 12, wherein the control step, when the number of simultaneously driven printing elements is not more than a predetermined value, sets a pulse width of the driving pulse larger than a pulse width calculated from the fundamental pulse ~~width~~ shape on the basis of the number of simultaneously driven printing elements.

20. (Previously amended) The method according to claim 12, wherein if the number of simultaneously driven printing elements for use in predischarge for recovering said printhead is limited, the control step comprises making a pulse width of a driving pulse to be applied to printing elements used in the predischarge larger than a pulse width of a driving pulse to be applied to printing elements for use in printing which uses printing elements not less than the number of simultaneously driven printing elements.

21. (Previously amended) The method according to claim 12, wherein when predischarge for recovering said printhead is to be performed, the control step comprises applying a driving pulse having a predetermined width to printing elements used in the predischarge.

22. (Previously amended) The method according to claim 12, wherein each printing element comprises an ink discharge unit comprising an electrothermal transducer for discharging ink by generating a bubble in the ink by heat and a discharge orifice.

23. (Currently amended) A computer-readable memory storing program codes of control of a printing apparatus for performing printing by using a printhead having a plurality of printing elements, comprising:

~~a program code of a counting step of counting the number of simultaneously driven printing elements of said plurality of printing elements when printing data is printed;~~

a program code of a determination step of determining a fundamental pulse ~~width~~ shape on the basis of a driving condition according to a condition of the printhead in a period other than a printing period; ~~and~~

a program code of a counting step of counting the number of simultaneously driven printing elements of the plurality of printing elements in the printing period; and

a program code of a control step of controlling a driving pulse to be applied to printing elements used in the printing of the printing data, wherein the driving pulse is a pulse generated in a printing period by correcting the fundamental pulse ~~width~~ shape determined in said determination step on the basis of the number of simultaneously driven printing elements counted in said counting step.

24. (Currently amended) The apparatus according to claim 1, wherein the fundamental pulse ~~width~~ shape is selected and determined from a plurality of fundamental pulse ~~widths~~ shapes.

25. (Previously amended) The apparatus according to claim 1, wherein the driving condition includes printhead characteristics.

26. (Currently amended) The apparatus according to claim 3, wherein said second management table holds as an index value a change in fundamental pulse ~~width~~ shape which is based on the number of simultaneously driven printing elements.

27. (Currently amended) The apparatus according to claim 26, further comprising another management table representing a relationship between the change in fundamental pulse ~~width~~ shape and the index value, the other management table being prepared for each printing mode.

28. (Previously amended) The apparatus according to claim 27, wherein one of the printing modes is a mode for performing printing complementarily in accordance with a printing pass count.

29. (Currently amended) The method according to claim 12, wherein the fundamental pulse ~~width~~ shape is selected and determined from a plurality of fundamental pulse ~~widths~~ shapes.

30. (Previously amended) The method according to claim 12, wherein the driving condition includes printhead characteristics.

31. (Currently amended) The method according to claim 14, wherein said second management table holds as an index value a change in fundamental pulse ~~width~~ shape which is based on the number of simultaneously driven printing elements.

32. (Currently amended) The method according to claim 31, further comprising another management table representing a relationship between the change in fundamental pulse ~~width~~ shape and the index value, the other management table being prepared for each printing mode.

33. (Previously amended) The method according to claim 32, wherein one of the printing modes is a mode for performing printing complementarily in accordance with a printing pass count.

34. (Currently amended) The apparatus according to claim 1, wherein said determining means determines the fundamental pulse ~~width~~ shape on the basis of a plurality of driving conditions according to the condition of the printhead.

35. (Currently amended) The method according to claim 12, wherein said determination step determines the fundamental pulse ~~width~~ shape on the basis of a plurality of driving conditions according to the condition of the printhead.

36. (New) The apparatus according to claim 1, wherein the period other than the printing period is at least one of a period before printing and a period during line return.

37. (New) The apparatus according to claim 1, wherein the fundamental pulse shape is a fundamental pulse width.

38. (New) The method according to claim 12, wherein the period other than the printing period is at least one of a period before printing and a period during line return.

39. (New) The method according to claim 12, wherein the fundamental pulse shape is a fundamental pulse width.

40. (New) The computer-readable memory according to claim 23, wherein the period other than the printing period is at least one of a period before printing and a period during line return.

41. (New) The computer-readable memory according to claim 23, wherein the fundamental pulse shape is a fundamental pulse width.